

BOTULISM

What is botulism?

Botulism is a rare but serious paralytic illness caused by a nerve toxin that is produced by the bacterium *Clostridium botulinum*. There are three main kinds of botulism: foodborne botulism is caused by eating foods that contain the botulism toxin; wound botulism is caused by toxin produced in a wound infected with *Clostridium botulinum*; and infant botulism is caused by consuming the spores of the botulinum bacteria, which then grow in the intestines and release toxin.

All forms of botulism can be fatal and are considered medical emergencies. Foodborne botulism can represent a major public health threat, because there may be many other persons at risk of poisoning from eating the same contaminated food.

What kind of germ is *Clostridium botulinum*?

Clostridium botulinum is the name of a type of bacteria commonly found in soil. These organisms grow best in low oxygen conditions. These bacteria form spores which allow them to survive in a dormant state until they are provided conditions that can support their growth. There are seven types of botulism toxin designated by the letters A through G but only types A, B, E, and, rarely, F cause illness in humans.

How common is botulism?

In the United States an average of 110 cases of botulism are reported each year. Of these, approximately 25% are foodborne, 72% are infant botulism, and the rest are wound botulism. Outbreaks of foodborne botulism involving two or more persons occur most years and are usually caused by eating contaminated home-canned foods. The number of cases of foodborne and infant botulism has changed little in recent years, but wound botulism has increased because of the injection of black-tar heroin, especially in California. In recent years, California has experienced an epidemic of this form of botulism and we now report most of the world's wound botulism cases and nearly $\frac{3}{4}$ of the cases reported in the United States.

What are the symptoms of botulism?

The initial symptoms are frequently double or blurred vision, drooping eyelids, and dry, sore throat. Progressive descending paralysis, usually symmetrical, may then follow. After affecting cranial nerve function (to cause slurred speech, difficulty swallowing, and inability of the neck muscles to support the head), paralysis of the extremities and respiratory muscles can occur. Infants with botulism appear lethargic, feed poorly, are constipated, have a weak cry, and poor muscle tone. These are all symptoms of the muscle paralysis caused by the bacterial toxin. In foodborne botulism, symptoms generally begin 18 to 36 hours after eating a contaminated food, but they can occur as early as 6 hours or as late as 10 days after.

How is botulism diagnosed?

Physicians should consider the diagnosis if the patient's history and physical examination suggest botulism. However, these clues are usually not enough to allow a definitive diagnosis of botulism. Other diseases, such as Guillain-Barré Syndrome, stroke, and myasthenia gravis, can appear similar to botulism, and special tests may be needed to distinguish these conditions from botulism. These tests may include a brain scan, spinal fluid examination, nerve conduction test (electromyography, EMG with repetitive nerve stimulation), and a Tensilon test for myasthenia gravis. The most direct way to confirm the diagnosis is to demonstrate botulinum toxin in the patient's serum, stool, or wound by injecting appropriate clinical specimens into mice and looking for signs of botulism in the mice. The bacteria can also be isolated from the stool of persons with foodborne and infant botulism, and can be recovered from the wounds of persons with wound botulism. In California, tests for botulism can be performed only at the California Department of Health Services (CDHS) Microbial Diseases Laboratory in Richmond, CA, and at the Los Angeles County Department of Health Services laboratory in Los Angeles.

How can botulism be treated?

The respiratory failure and paralysis that occur with severe botulism may require a patient to be on a breathing machine (ventilator) for weeks plus intensive medical and nursing care. After several weeks, the paralysis slowly improves. If diagnosed early, foodborne and wound botulism can be treated with an antitoxin made from horse serum which blocks the action of toxin circulating in the blood. This can prevent patients from worsening but cannot reverse the paralysis. Physicians may try to remove contaminated food still in the gut by inducing vomiting or by using enemas. Wounds may need to be treated, usually by surgery (along with antibiotics), to remove the source of the toxin-producing bacteria. Good supportive care in a hospital is the mainstay of therapy for all forms of botulism. Botulism Immune Globulin (BIG), made from human donors, is available to physicians for the treatment of infant botulism by contacting CDHS' Infant Botulism Treatment and Prevention Program.

<http://www.dhs.ca.gov/ps/dcdc/html/ibtindex.htm>

Are there complications from botulism?

Death, when it occurs among botulism cases, generally results from respiratory failure. However, in the past 50 years, the proportion of patients with botulism who have died has fallen dramatically from about 50 percent to eight percent, through high-quality supportive care. A patient with severe botulism may require intubation and ventilatory support, as well as intensive medical and nursing care for several months, in the most severe cases. But even the worst cases tend to recover, though the recovery period may be protracted and cases experience easy fatigability and shortness of breath for a considerable time. But the ultimate recovery from paralysis stands in stark contrast to

the more bleak outcome of persistent paralysis commonly caused by stroke and other conditions that can be confused with botulism.

How can botulism be prevented?

Botulism can be prevented. Foodborne botulism has often been from home-canned/home-preserved foods with low acid content, such as asparagus, green beans, beets and corn. However, outbreaks of botulism have also occurred from more unusual sources such as chopped garlic or onions in oil, improperly handled baked potatoes, and home-fermented fish. Persons who do home canning should follow strict procedures to reduce contamination of foods. Oils infused with garlic or herbs should be refrigerated. Potatoes which have been baked while wrapped in aluminum foil should be kept hot until served or refrigerated. Because the botulism toxin is destroyed by high temperatures, persons who eat home-canned foods should consider boiling the food for ten minutes before eating it to ensure safety. Instructions on safe home canning can be obtained from the UC Cooperative Extension, or from the US Department of Agriculture (see below). Because honey can contain spores of *Clostridium botulinum* and this has been a source of infection for infants, children less than 12 months old should not be fed honey. Honey is safe for persons 1 year of age and older. Wound botulism can be prevented by promptly seeking medical care for infected wounds and by not injecting street drugs.

What are public health agencies doing to prevent and control botulism?

Public education about botulism prevention is an ongoing activity. Information about safe canning is widely available for consumers. Physicians, through their local health departments, can consult with persons knowledgeable about botulism 24 hours a day. If antitoxin is needed to treat a patient, it can be promptly provided to a physician anywhere in the state. Suspected outbreaks of botulism are quickly investigated and, if they involve a commercial product, appropriate control measures are promptly coordinated among public health and regulatory agencies. Physicians should report suspected cases of botulism immediately to their local health department.

For information and guidelines on proper homecanning and preserving, see: [USDA Home Canning Guide](http://foodsafety.cas.psu.edu/canningguide.html) <http://foodsafety.cas.psu.edu/canningguide.html> and from UC Davis/Agriculture and Natural Resources (ANR): <http://anrcatalog.ucdavis.edu/merchant.ihtml?id=357&step=2>

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